

Education and Technology : American School Reform Movement in the 1990s

Masamichi OKUBO

Division of the Fundamentals of Arts

Introduction

The discussion of school reform was very popular during the 1980s in the United States. Ineffective curriculum, obsolete classroom settings, less qualified teachers, and other problems found in American education system were argued, and different researchers and educators suggested their formulas of school reform and improvement. New technologies were sometimes proclaimed as the remedies for such problems, but few successful results have been reported so far. There is, however, a new trend of suggestions for school improvement and technologies recently.

1. Trends of school reform movement

The argument of educational reform in the 1980s in the United States could be represented by *A Nation at Risk : The Imperative for Educational Reform*.¹ This book, prepared by the National Commission on Excellence in Education, pointed out the poor results of American public education. They indicated that many students did not possess minimum reading, writing, and arithmetic skills necessary for functioning in society even after the 12 years of compulsory education in the United States.

Horace's Compromise : The Dilemma of the American High School is another book published in the United States during the 1980s that revealed the defective state of American schools.² A fictional character Horace, who is a fine teacher and realizes his school's traditional teaching practices are failing, makes compromises because of the pathetic school circumstances. The book was written by TheodoreSizer based on the findings from an inquiry into the state of American secondary education conducted from 1979 to 1984.

Hearing these kinds of reports about students' failing academic performances, some people called for mastery of basic skills, tougher requirements, longer school days, longer school years, and more strict achievement measures. There were several books written in during those days talking about basic knowledge every student should possess. Such people frequently talked about the effective ways of teaching traditional school materials ; finding better ways of doing the same things that teachers had been doing for years at school. Technologies were applied for such tasks, doing the same things but better and efficiently. Such ways of technological application could hardly bring about new possibilities. It was like just trying to replace teachers with machines. In such circumstances, teachers often

refused to use new technologies and relied on the same old methods they were taught. Schools changed little by these attempts, and students continued to fail in schools. Karen Sheingold analyzed such a kind of failures of technological application. She said :

past technologies have been promoted as 'the answer' for education. Today, these views are generally tempered by an understanding that it is not the features of the technology alone, but rather the ways in which those features are used in human environment, that shape its impact.³

The disappointing results of the 80s school reform movement generated the search for new possibilities for school reform. One such attempt is restructuring. The term "restructuring" came to be known through *A Nation Prepared*.⁴ Restructuring calls for the totally new type of schooling system, different from the traditional system. Jane L. David defined that "(t)he goal of restructuring is to fundamentally transform teaching and learning in order to prepare students for the 21st century."⁵ Renee Campoy explained, "Restructuring implies a radical change in the schooling process with an emphasis on *student centered-schooling* as opposed to *textbook-based curriculum*."⁶ The advocates of restructuring talk about what the students would need after they graduate and when they enter the society as a part of work force. Such a way of thinking is quite different from the 1980s' talks about how students are failing to perform the required academic achievement levels. During the 80s, the emphasis was often on the memorization of knowledge, and the application of such knowledge and skills was rather ignored or just not covered due to the lack of time, facilities, and manpower.

Today more educators seem to realize the importance of skills and knowledge that are practical and needed in the work place. Sheingold acknowledged, "Educators and policy makers nation wide recognize the critical need for students to learn how to think, to understand concepts and ideas, to apply what they learn, and to be able to pose questions and solve problems."⁷ Such teachers are trying to prepare students for the real world, rather than just cover the material that has been taught for years.

2. Technology-supported education reform

The emphasis of education reform of the United States in the 1990s seems to be moving from the memorization of facts toward the mastery of thinking skills and problem-solving skills. David claimed, "Re-

structuring seeks to transform the current education system into one capable of providing students with the kinds of skills they need in today's world and the world of tomorrow."⁸ In order to achieve such a goal, according to David, an emphasis must shift from the mastery of "isolated facts, skills, and coverage" to the learning of "integrated content, on the application of skills, and on the development of conceptual understanding."⁹ This means that teachers will be also asked to do different teaching activities. They need to find the ways to teach students "how to apply skills, how to understand concepts and solve problems, how to work collaboratively, and how to take responsibility for learning."¹⁰

Technology is expected to take a great role in such a teaching task. Several educators and researchers are proclaiming their expectancy for the possibility of technology today. There are several reports from schools that have started to reconstruct their teaching practices by utilizing available technologies.

Barbara Means and Kerry Olson examined such programs. One of them was found at Frank Paul Elementary School, which is located in Slinas, an agricultural town in California. Means and Olson observed a project conducted in a fifth-grade classroom there. The school served a poor community which had problems with crime, drugs, and gangs. The population of the community consisted of several different minority groups. The teacher, who held a bilingual credential and had twelve years of teaching experience, applied technology into his classroom and developed curriculum material on local minority leaders. In this project students identified their local heroes from different ethnic groups and different occupations, conducted interviews and videotaped the sessions, and composed written highlights from interviews using word-processing software on computers.

There are superb attributes of this type of technology-applied projects. One of them is that the students are not learning about the technology but learning the advanced level skills using technology. Means and Olson said :

it is clear that technology per se is not the driving force behind either curriculum planning or skillful instruction. The teachers' selection of challenging projects and their skills in orchestrating students' work with or without technology appear to be much more important than the availability of hardware or software.¹¹

Technology also made the task feasible and motivated the students to do the challenging work. Means and Olson remarked, "Technology made it possible for students to aspire to producing materials of a quality that would tempt others to purchase copies of them."¹²

This type of technology-supported project proved to be an effective method for teaching advanced level skills. Means and Olson claimed :

the project provided a meaningful context for

learning and practicing complex skills in a variety of cognitive, social, and technical domains as students planned and organized their activities, engaged in video recording and editing, and identified and solicited appropriate local leaders for participation.¹³

Not the project itself, but the very act of using technology also seems to be beneficial for teaching advanced level skills. Means and Olson testified, "technology appears to stimulate problem-solving and thinking skills as students engage in the process of selecting appropriate tools and manipulating those tools to achieve their ends."¹⁴

Another advantage is the primary characteristics of technology ; enhancing human abilities. Means and Olson stated :

technology appears to provide an advanced entry point, allowing students to engage in content areas and inquires that might otherwise be inaccessible to them until a much later point in their academic careers. In more traditional activities, such as writing a research report or creating a calender, technology can extend and enhance what students are able to produce.¹⁵

This means that technology expnded students' learning abilities. The technology enabled the students to do the tasks which they otherwise could not do. Tchnology supports human learning and makes it possible for them to do better, like it did in other areas of human behavior, such as telephones for communication and cars for transportation.

Some people may argue that such a project type of teaching style can be administered without the help of technology. It is true to a certain degree. However, the application of technology into such a task makes the work better and advanced. The use of technology stimulated students to try their best to conduct interviews, and technology provided the higher entry level of learning. Projects without technology cannot make students do so much work at such a level.

The application of technology is beneficial not only for the students but also for the teachers. Like it does for students, technology amplifies "what the teachers can do."¹⁶ Technolgy also "increases teachers' sense of professionalism and achievement" and "adds significance and cultural value to school tasks."¹⁷ This sense of professionalism among teachers is important, especially in the United States where the status of teachers in the society is not so high compared to professionals, such as lawyers and engineers. The sense of professionalism helps teachers to have high self-esteems and motivates them to do their best in teaching. Positive atmosphere would be created in schools also.

There is another good change brought to be the community of teachers by technological application ; stimulation for the search of new curriculum possibility and collaboration among teachers in the issues of

teaching practices. Means and Olson noted:

Through time-honored tradition, teachers are the rulers of the classroom, deprived, for the most part, of the opportunity to collaborate with adult colleagues on the central issues of teaching method and content and often anxious about submitting their practices to outside scrutiny. One of the most striking things about several of the schools we visited ... was the coherence of the instructional program and the way teachers talked to each other about what they are teaching and how. We argued earlier that new technology can be a catalyst to stimulate teachers to think about new projects and curriculum possibilities. At the same time, teachers learning about technologies face inevitable trials and tribulations. Both experiences can stimulate discussions among teachers going through this process of learning and experimentation together.¹⁸

It may appear peculiar to the people who do not know much about teachers that there is very little collaboration among teachers for the main things of their work, issues of teaching method and content. After they learn such issues at college during their training, teachers have a very limited chance of learning new developments once they start to work in actual classrooms. If they wish to learn, they have to go back to school and take more education courses. Collaboration and talks among teachers concerning new possibilities for teaching are revolutionary in such a school norm.

Means and Olson suggested four kinds of good changes brought by the new technology-supported teaching style: student motivation, high entry level, ease of teaching higher level skills, and teacher improvement. Another area of education that needs improvement is meeting the needs of each individual student. It has been difficult to genuinely meet the individual needs of students, even though educators knew that it was essential for effective education. Introduction of technologies into classrooms may enable teachers to do such a task once thought impossible. Sheingold argued that "learning must be individualized much more than the typical format of whole-group lessons will allow" since "students come to school with markedly different backgrounds, interests, and skills."¹⁹ Like it was discussed by Sheingold, the importance of individualized instruction has been recognized by teachers, but it could not be actualized because of obstacles found in schools, such as materials required by the state to cover and a limited number of teaching staff. Restructuring calls for breaking of the lockstep school system and providing a kind of truly individualized instructions for each of the students, the kind of instructions that can put priority on the student understanding rather than on the coverage of the given material. Technology, if applied correctly and efficiently, has the potential for actualizing such a kind

of classrooms. David C. Berliner declared, "An ungraded public school, a dream of reformers for decades, may actually be developed in the 21st century, with a little help from technology."²⁰ Berliner discussed that technology can help teachers meet students' individual needs more effectively.

Teachers can find ways to give some students more time, thereby, increasing their learning. Instead of believing that only some students can learn in the time we have for instruction, teachers and schools can act on the premise that all normal children can learn, but that some will do so more quickly than others.²¹

with the help of technology, a teacher can pay more attention to each of the students in the room, a kind of attention that was unable to be given before. In a traditional classroom setting, instructions are usually given to all students at one time, and the students have to learn at the same pace. If a student cannot learn as fast as others, then he or she would fail to learn the subject of the lesson and fall behind. New technologies, especially computers, can prevent such failures and help every student to learn.

Several changes are expected when school restructuring through technology implementation occurs. Skills and knowledge students would gain, instructional methods, classroom activities, and classroom settings will be all different from those of a conventional school. What teachers and students do will also be modified, and so is the relationship between them. Both of them would play new roles unlike the ones in conventional classrooms. Berliner described that the new teacher-student relationship "can have more of the characteristics of the real world, where members of groups genuinely seek information to questions for which they really do not know the answers."²² Such a view seems to be logical since one of the main goals of restructuring movement is to help students gain the skills needed in the real world. Berliner maintained that a classroom based on such a teacher-student relationship "should lead to higher levels of productivity and satisfaction for both students and teachers" according to the motivational theory.²³

Sheingold studied a school making restructuring effort using computers for teaching thinking and problem-solving skills. She ascertained another type of role change of teachers there. She noticed that teachers "also became aware that, when working with students on the computers, they needed to play a different kind of role -- more facilitative than directive -- and that this transition was a very difficult one to make."²⁴ This role change of teachers could be the main obstacle for the restructuring movement. It is very hard for anybody to give up one's authority and control. Restructuring, however, requires such a change among teachers.

The kind of knowledge and skills students would gain at a technology-supported restructured school will

be different from the traditional materials. Then, traditional comprehensive tests, such as multiple-choice tests, would be replaced by kinds of tests that can measure the performance that students exhibit by using the knowledge and skills gained through learning. Berliner talked about such tests and a new teacher's role. He said, "Using performance tests for assessment requires another change in teaching. The teacher's role becomes more like that of a coach who is helping the student prepare for a public performance or athletic contest."²⁵ He speculated more about the uniqueness of the performance test. According to Berliner, "performance tests are transparent, that is, test-takers know what is coming, how to prepare for it, have extended time to prepare for it, and are coached to succeed at what they know."²⁶ One problem with this view is that it sounds like the test is the end of the process, which should not be true. Tests are just measurements of accomplishments.

3. Obstacles against technology-supported restructuring

There is, of course, expected resistance against restructuring and technology implementation. Robert C. Snider observed that "the basic acts of classroom teaching have changed very little despite sporadic efforts at research and reform -- with and without machines" during the past 90 plus years.²⁷ This is generally an accurate opinion about change in schools. Snider also presented his observation about the resistance against changes through technology implementation: "antimachine animus seems to have been expected, almost automatic, humanistic response to technology whenever it has been proposed as a solution to cultural problems in or out of school."²⁸

There are warnings against the unquestioned hope for technological application and restructuring, the kind of hope that comes from treating business and education as a same kind of tasks. Even though the possibility which emerges from possessing skills for utilizing technology is very promising for students as future work force of the society, we should not misconstrue the goals of education with the goals of business. Campoy asserted that "(p) hilosophically, the purposes and goals of education and business are not comparable" and the "process that drives education is different from business, and schools should not expect computers to accomplish the same kinds of results."²⁹ It is easy to expect technology to do the same kinds of improvement for classrooms like it did for work places. Such a misconception is held not only among general public but also among the educational circle.

Technology can promise the improvement of classroom activities, but teachers must have the ability to handle the technologies in the classroom. It is very questionable that today's average teachers possess such skills or knowledge. This could be a very serious problem for school improvement through technological

application. If teacher cannot or would not use the technology, restructuring cannot take place no matter how powerful the technology found in the classroom. Berliner indicated:

The classroom of the future, with technology that allows a greater degree of independence of the learner from the lockstep curriculum, will require management skills and content knowledge well beyond that possessed by the typical teachers of today. Teachers will be responsible for managing a greater range of educational experience in their classrooms. This means that teachers will need to be more intellectually talented than they are today.³⁰

Whether this becomes a problem or not will be determined by the plight of teachers. If teachers continue to be treated like today, this could be a serious problem. The environment where teachers could work more like professionals rather than just white-collar workers is needed.

There are opinions that such resistance should not continue so long. Allan Collins explained, "In a society where most work is becoming computer-based, 'schoolwork' cannot forever resist the change."³¹ He assumed that "for students, the technology represents the future."³² This seems to be a very important point. If students and their parents find technology promising, teachers cannot keep denying it in schools too long. Not only students and their parents but also the students' future employers would also demand schools to teach students skills necessary for them to work efficiently and effectively with technology. Collins believed the eventual technology integration. He maintained, "Schools are in the business of teaching students how to read and write and calculate and think. As the computer becomes an essential tool for doing these things in society at large, its use by students is inevitable."³³

Collins also thought that the availability of technology will overcome the resistance and other obstacles like interlocking school system. He assumed that "schools should start using computers as tools as much as possible" because "if you have computers that are easy to understand and that are powerful tools for doing schoolwork, then people will eventually figure out how to use them."³⁴

David indicated two reasons that the present and future technologies would have a different fate in the school reform movement from the past attempts. She deemed that "the power, versatility, portability, and ease of use of today's technologies are altogether different from those of the past."³⁵ Another reason she suggested was "the simultaneous presence of restructuring activities."³⁶

Conclusion

Today an increasing number of educators seem to realize both the potentials and obstacles of technology-

supported restructuring. What is unique about these educators' approach to technology and restructuring is that their emphasis is placed on changing of traditional teaching exercises. They treat technologies only as part of new teaching methods. They see the great potentials of technologies but do not treat the mastery of technologies as the objective of education. Such teachers think that what students need are basic skills, especially problem-solving skills, which, in the future, students can use as the foundation where they would build their own individual skills necessary for functioning as members of the society. What students need to learn is neither how to use a specific type of computer software nor how to operate a camcorder. Software and machines are always changing and improving. Latest technologies become outdated obsolete things in the matter of a few years today. The speed of this progress would continue to increase. Students need to know that they can utilize available technologies in executing their required tasks, such as learning and problem solving. They need to realize that technologies can enhance their working abilities and skills. Such kinds of understandings can be found in the present technology-supported restructuring movement.

Traditional American schooling system has proven to be failing, and a new system is necessary in order to meet the needs of students. Restructuring through technological application seems to be one of the trends of American school reform efforts, and expectations are high among many educators and researchers for the possibilities of technology-supported restructuring. There are schools already started to work on such reforms, and several encouraging reports are made from some of these schools. Although more research is needed in order to determine whether such a trend would succeed and continue or not, the search for possibilities of technology and restructuring seems to continue through the next century. Based on the present findings, careful planning and well determined decisions are needed in order to succeed this restructuring with technology. Otherwise, it could be another incident in the history of failed reform attempts. Multimedia, information highway, networking, affordable powerful computers, and other amazing technologies are becoming part of our lives, but we should not be overwhelmed by the new progress. We need to seek the best way to take advantage of these technologies for improving educational practices.

References

- 1) National Commission on Excellence in Education, *A Nation at Risk: The Imperative for Education Reform* (Washington, DC; Author, 1983)
- 2) Theodore R.Sizer, *Horace's Compromise: The Dilemma of the American High School* (Boston, Houghton Mifflin Company, 1984)
- 3) Karen Sheingold, "Restructuring for Learning with Technology: The Potential for Synergy," *Phi Delta Kappan* 73 (Sep. 1991): 18.
- 4) Carnegie Forum on Education and the Economy, *A Nation Prepared: Teachers for the 21st Century* (Washington, DC, Author, 1986)
- 5) Jane L. David, "Restructuring and Technology: Partners in Change," *Phi Delta Kappan* 73 (Sep. 1991): 38.
- 6) Renee Campoy, "The Role of Technology in the School Reform Movement," *Educational Technology* 32 (Aug. 1992): 17.
- 7) Sheingold, 18.
- 8) David, 38.
- 9) David, 39.
- 10) David, 40.
- 11) Barbara Means and Kerry Olson, "Tomorrow's Schools: Technology and Reform in Partnership," *Technology and Education Reform: The Reality Behind the Promise*, ed. Barbara Means (San Francisco: Jossey-Bass Publishers, 1994), 200-01.
- 12) Means and Olson, 194.
- 13) Means and Olson, 194.
- 14) Means and Olson, 201.
- 15) Means and Olson, 201.
- 16) Means and Olson, 201.
- 17) Means and Olson, 202.
- 18) Means and Olson, 215.
- 19) Sheingold, 19.
- 20) David C. Berliner, "Redesigning Classroom Activities for the Future," *Educational Technology* 32 (Oct. 1992): 10.
- 21) Berliner, 9.
- 22) Berliner, 8.
- 23) Berliner, 8.
- 24) Berliner, 19.
- 25) Berliner, 11.
- 26) Berliner, 11.
- 27) Robert C. Snider, "Machine in the Classroom," *Phi Delta Kappan* 74 (Dec. 1992): 316.
- 28) Snider, 317.
- 29) Campoy, 19.
- 30) Berliner, 10.
- 31) Allan Collins, "The Role of Computer Technology in Restructuring Schools," *Phi Delta Kappan* 73 (Sep. 1991): 28.
- 32) Collins, 28.
- 33) Collins, 31.
- 34) Collins, 35.
- 35) David, 38.
- 36) David, 38.